Ratios and Proportional Relationships **Understanding the organization of God's plan**
Understand ratio concepts and use ratio reasoning to solve problems
1. Use ratio language to describe a ratio relationship between two quantities. Distinguish between part-to-part and part-to-whole relationships. For example, the ratio of wings to beaks in the bird house at the zoo was 2:1, because for every two wings there was one beak; or, for every vote candidate A received, candidate C received nearly three votes.
2. – Use unit rate language ("for each one", and "per") and unit rate notation to demonstrate understanding the concept of a/b associated with a ratio a:b with b ≠ 0. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger." (Expectations for unit rates in this grade are limited to non-complex fractions.)
3. - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
3a. - Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
3b. -Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?
3c -Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
4d. - Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
Example with infusion: For every rosary, find the ratio of the number of Hail Marys to Our Fathers.
The Number System **Recognizing the constancy of God's love through the constancy of math.**
Apply and extend previous understandings of multiplication and division to divide fractions by fractions
1. - Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mile and area 1/2 square mile?
Example with infusion: If 3/4 of the congregation takes communion, and 1/4 of those take the Blood of Christ, what fraction of the total congregation takes the Blood?
Compute fluently with multi-digit numbers and find common factors and multiples
2. - Fluently divide multi-digit numbers using the standard algorithm.
3. - Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
4. - Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2).
Example with infusion: REL.6.6 - Find the common factors of the "lamenting" and/or "petition" Psalms numbers 51, 78 and 105.
Apply and extend previous understandings of numbers to the system of rational numbers
5. – Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in

each situation.
6. - Understand a rational number as a point on the number line and a coordinate pair as a location on a coordinate plane.
6a. - Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
6b. - Recognize signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
6c. -Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
7. - Understand ordering and absolute value of rational numbers.
7a. - Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.
7b. - Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write –3°C > –7°C to express the fact that –3°C is warmer than –7°C.
7c. - Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.
7d. - Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.
8. – Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
Example with infusion: Your church collects on average $47,000/week in collections, and its monthly expenses amount to $180,000/month. Find the annual debit/credit amount of your church's bank account.
Expressions and Equations **Recognizing God's truth through the beauty of mathematical laws.**
Apply and extend previous understandings of arithmetic to algebraic expression
1. – Write and evaluate numerical expressions involving whole-number exponents.
2. – Write, read, and evaluate expressions in which letters stand for numbers.
2a. - Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation “Subtract y from 5” as 5 – y.
2b. -Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.
2c. -Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s^3 and $A = 6s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.
3. -Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.

Example with infusion: A new diocesan church is formed, and every year for the first three years doubles in the number of registered parishioners. Explain and use the formula 2^3(x) (where x = number of registered parishioners when the church formed), will be the number of parishioners after three years.
Reason about and solve one-variable equations and inequalities
4. –Understand solving an equation or inequality as a process of answering a question: which values from a specified set, in any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes and equation or inequality true.
5. - Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6. – Solve one step equations involving non-negative rational numbers using addition, subtraction, multiplication and division.
7. - Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
Example with infusion: In the formula x + y = z, where x = number of Books from the Old Testament and z = number of total Books from the Bible; if x = 46, and z = 72, then 46 + y = 72 shows that y is the number of Books from the New Testament.
Represent and analyze quantitative relationships between dependent and independent variables
9. – Use variables to represent two quantities in a real-world problem that change in relationship to one another. Identify the independent and dependent variable. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.
Example with infusion: We need 25 Bibles in every classroom, explain and use how the formula T = 25C can be used to determine how Bibles are needed if C = number of classrooms.

Geometry **Identifying the beauty of God's creation in Geometric shapes.**
Solve real-world and mathematical problems involving area, surface area, and volume
1. - Find the area of all triangles, special quadrilaterals, (including parallelograms, kites and trapezoids) and polygons whose edges meet at right angles (rectilinear figure) by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
2. – Find the volume of a right rectangular prism with fractional edge lengths by applying the formulas V = *lwh* and V =B*h* (B is the area of the base and *h* is the height) to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. (Builds on the 5th grade concept of packing unit cubes to find the volume of a rectangular prism with who number edge lengths.)
3. - Draw polygons whose edges met at right angles (rectilinear figure polygons) in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
4. - Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
Example with infusion: Find the volume and surface area of a classroom crucifix.

Statistics and Probability **Develop an understanding of the diversity of God's creation.**
Develop understanding of statistical variability
1. – Recognize an generate a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.
2. – Analyze a set of data collected to answer a statistical question with a distribution which can be described by its center (mean, median, mode), spread (range and/or interquartile range) and overall shape (cluster, peak, gap, symmetry, skew (data) and/or outlier).
3. – Recognize that a measure of center (mean, median and/or mode) for a numerical data set summarizes all of its values with a single number, while a measure of variation (range and/or interquartile range) describes how its values vary with a single number.
Example with infusion: Using statistics, compare the student population of your school with the other student-aged parishioners from your church.
Summarize and describe distributions
4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
5. - Summarize numerical data sets in relation to their context
5a. -Reporting the number of observations.
5b. -Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
5c. -Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
5d. -Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
Example with infusion: Analyze and compare the number of chapters in each of the four gospels using mean, median and mode.